

swimming upstream

San Juan River Basin Recovery Implementation Program
Upper Colorado River Endangered Fish Recovery Program

Bringing the endangered razorback sucker back from the brink of extinction

Historically, the razorback sucker (*Xyrauchen texanus*) was widespread and abundant in the Colorado River and its tributaries, but today wild populations are extremely rare. The razorback sucker is a unique fish with an abrupt, sharp-edged hump behind its head and the only member of the genus *Xyrauchen*.

The razorback sucker is a large-river fish found only in the Colorado River Basin. Since the early 1900s, the installation of dams, the removal of water for human use and the introduction of nonnative sport fish have changed the character of the Colorado River. The effects of these changes have contributed to the decline of this, and three other endangered fish species that exist nowhere else on earth — humpback chub (*Gila cypha*), bonytail (*Gila elegans*) and Colorado pikeminnow (*Ptychocheilus lucius*).

The razorback sucker was listed as endangered and given full protection under the Endangered Species Act in 1991. Razorback suckers can live for more than 40 years and grow to over three feet in length. The fish has a dark, brownish-green upper body with a yellow- to white-colored belly. Adults can reproduce at 3 to 4 years of age. Playing an important ecological role, razorback suckers eat insects (including fly and mosquito larvae), plankton and decomposing plant matter on the bottom of the river.

Life history

The razorback sucker evolved in warm-water reaches of larger rivers of the Colorado River Basin from Wyoming to Mexico 325 million years ago. To complete its life cycle, the razorback sucker moves between adult, spawning and nursery habitats. Spawning occurs during high spring flows when razorback suckers migrate to cobble bars to lay their eggs. Larvae drift from the



RAZORBACK SUCKER (*XYRAUCHEN TEXANUS*)

spawning areas and enter backwaters or floodplain wetlands that provide a nursery environment with quiet, warm and shallow water.

Research shows that young razorback suckers can remain in floodplain wetlands where they grow to adult size. As they mature, razorback suckers leave the wetlands in search of deep eddies and backwaters where they remain relatively sedentary, staying mostly in quiet water near shore. In the spring, razorback suckers return to the spawning bar, often quite a long distance away, to begin the life cycle again.

Colorado River Basin

The Colorado River Basin is divided into upper and lower basins at Lee's Ferry, Ariz. Fishery habitats are extremely varied, ranging from high mountain streams to red rock canyon walls in northern areas, to large manmade reservoirs and warm, turbid, swift-flowing reaches with shifting sand and marshy borders in southern portions.

Recovery efforts show success

Partnerships of local, state and federal agencies; American Indian tribes; water and power interests; and environmental groups are working to conserve and recover the endangered fishes. The

Upper Colorado River and San Juan River Basin Endangered Fish Recovery Programs span rivers in Colorado, Utah, Wyoming and New Mexico. The Lower Colorado River Basin (Lower Basin) encompasses portions of Arizona, Nevada and California and includes Lake Mohave, Lake Mead and Lake Havasu. Efforts to conserve rare species in the lower basin are managed primarily by the Lower Colorado River Multi-Species

Conservation Program and the Lake Mohave Native Fish Work Group. The goal is to achieve natural, self-sustaining populations that no longer require protection under the federal Endangered Species Act.

This major undertaking involves restoring and managing stream flows and habitat, boosting wild populations with hatchery-raised endangered fish and reducing negative interactions with certain nonnative fish species. These actions include:

Managing water to provide adequate instream flows to create beneficial water flow. Water resources are managed in accordance with state water laws, individual water rights and interstate compacts. Actions include water leases and contracts, coordinated water releases from upstream reservoirs, efficiency improvements to irrigation systems and reoperation of federal dams and reservoirs.

Construction projects to improve river habitat. Fish passages and screens are in place at nearly all major diversion dams on the Upper Colorado, Gunnison and

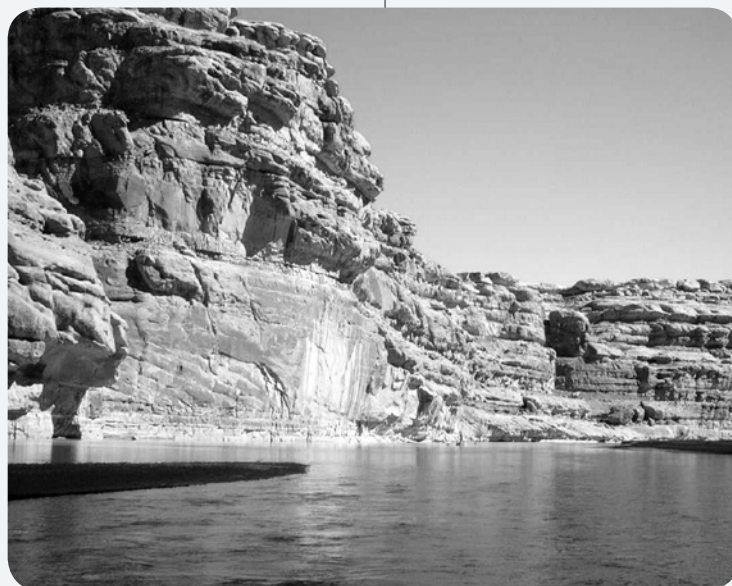
San Juan rivers, providing endangered fish with hundreds of miles of critical habitat. The programs are working to complete the few remaining fish screens and passages needed in the Upper Colorado River and San Juan River basins. A total of 2,700 acres of flood plain wetlands have been restored in the upper Colorado River system.

During 2007, six ponds were constructed on Imperial National Wildlife Refuge about 50 river miles above Yuma, Ariz. The ponds are part of a habitat mosaic designed for fish and wildlife. The ponds, which total about 80 surface acres, are being stocked with razorback suckers as well as bonytails. These will be managed as a native fish refuge.

Reestablishing endangered fish populations through propagation and stocking. Hatchery facilities and multiple riverside ponds maintain genetic quality and age structure and produce the fish to reestablish wild razorback sucker populations. Since 1996, about 162,300 razorback suckers have been stocked in the upper Colorado River system, and since 1994, about 48,300 razorback suckers have been stocked in the San Juan River. From 1997 to the present, about 90,000 razorback suckers have been reestablished in the Colorado River below Parker Dam south of Lake Havasu City, Nev. In 2007, 20,012 razorback suckers were stocked throughout the Lower Basin. The stocking efforts show success:

- Stocked razorback suckers are moving between the Colorado, Green and Gunnison rivers, suggesting that razorback suckers may eventually form a network of populations or subpopulations.
- Stocked razorback suckers are behaving as wild fish. They have been recaptured or observed in reproductive condition at spawning sites in the Green and San Juan rivers and, based on captures of larval fish, are reproducing in the wild in the Colorado, Green, Gunnison and San Juan rivers.

—continued on page 3



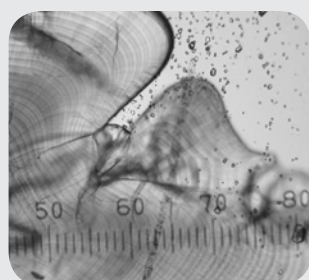
RAZORBACK SUCKERS PREFER WARM-WATER REACHES OF LARGE RIVERS, SUCH AS THE SCENIC SAN JUAN RIVER IN NORTHERN NEW MEXICO AND SOUTHEAST UTAH.

In this issue



Boosting survival of the Yampa's native fishes, p. 2

Biologists work to remove and relocate nonnative fishes from the Yampa River.



Now hear this, you predator fish, p. 3

Studying the ear bones of small-mouth bass key to managing nonnative fish populations.



Fish hatcheries help in recovery efforts, p. 4

Six regional hatcheries work to increase endangered fishes' chances of coping in the wild.



Recovery programs recognized, p. 5

Upper Colorado River and San Juan River recovery programs earn national award.



Joy to the fishes (and the people), p. 6

Dedication ceremony celebrates completion of fish passage at Price-Stubb Diversion Dam.

Strategy approved to restore Yampa River’s native fish populations

People from around the world visit northwest Colorado each year to witness the beauty and magnificence of the Yampa River — one of the last free-flowing rivers in the west. Thousands enjoy rafting the river where it carves a spectacular canyon through the heart of Dinosaur National Monument on the Colorado-Utah border. Others prefer to swim, tube and fish in the calmer waters downstream.

While people enjoy the scenic and recreational benefits of the river, Upper Colorado River Endangered Fish Recovery Program (Recovery Program) biologists view the Yampa River as one of the most important river habitats for recovery of the endangered fishes — humpback chub, bonytail, Colorado pikeminnow and razorback sucker.

As the largest tributary to the Green River, the Yampa River plays a critical role in the lifecycle of the endangered fishes in the Upper Colorado River Basin (Upper Basin). Razorback suckers and Colorado pikeminnows spawn in the lower reaches of Yampa Canyon, which also harbors one of five remaining populations of humpback chub in the Upper Basin. In addition to directly providing habitat, the Yampa River delivers flows and sediment downstream to the Green River, helping to maintain a river system with hundreds of miles of habitat considered vital to the recovery of the endangered fishes.

Nonnative fish threaten survival of young endangered fish

Young endangered fish are at high risk of being eaten by abundant nonnative fish species that also live in the Yampa River. Northern pike and smallmouth bass are the two nonnative fish species that researchers are most concerned with because they are active predators that consume a wide size range of fish, including endangered fishes. Management of nonnative fishes is considered vital to the long-term conservation of endangered and other native fishes, including roundtail chub, flannelmouth sucker, bluehead sucker and speckled dace.

The Recovery Program has researched the effects of nonnative fish and worked to manage their numbers in various locations throughout the Upper Basin. Since 2004, the Recovery Program has implemented a comprehensive nonnative fish management plan in the Yampa River. The plan



STARTING IN 2007, BIOLOGISTS HAVE NOTICED A DECLINE IN THE NUMBERS OF LARGE NORTHERN PIKE LIKE THIS ONE THAT U.S. FISH AND WILDLIFE SERVICE BIOLOGIST DAVE BEERS REMOVED FROM THE UPPER YAMPA RIVER ABOVE CRAIG, COLO.

includes active removal and relocation of these problematic species as well as research studies to determine their source of origin.

Biologists with the Colorado Division of Wildlife, Utah Division of Wildlife Resources, U.S. Fish and Wildlife Service and Colorado State University conduct the work for the Recovery Program. The management plan recognizes the dual responsibilities of state and federal fish and wildlife agencies to conserve species while providing sportfishing opportunities.

“In the Yampa River, we’re using a variety of techniques to remove northern pike and smallmouth bass that include multiple-pass electrofishing, hoop and trammel nets and seines,” said Tom Chart, nonnative fish coordinator for the Recovery Program. “Since we implemented these techniques in 2004, large-sized northern pike have been reduced in parts of the Yampa and Green rivers, but we are seeing less success with smallmouth bass. Low flows since 2000 have created conditions suitable to smallmouth bass reproduction and survival. Levels of effort to remove and relocate these fish may need to increase.”

Research models predict that the minimum annual removal rates of adult fish needed to cause a long-term reduction in the population size of smallmouth bass is 65 percent. The Recovery Program is achieving that level of removal in some reaches of the Yampa River but not in all.

“Our approach to the control of threats posed by populations of nonnative fish like northern pike and smallmouth bass originated with the objective of

effectively reducing the abundance of these predators to minimize the threat and enable native fish populations to respond,” said Tom Nesler, wildlife conservation manager, Colorado Division of Wildlife. “This plan represents the strategies we feel are necessary to properly manage this threat.”

Yampa River nonnative fish management strategy approved to increase success

The Recovery Program approved a Yampa River Nonnative Fish Management Strategy this year to ensure that nonnative fish management actions are of sufficient scale and intensity to result in measurable success. The strategy is based on research findings and is consistent with the Recovery Program’s Nonnative Fish Management Policy.

The strategy expands current efforts and directs future management of nonnative fishes in the Yampa River. The strategy consists of six elements with specific action items and timeframes:

- **Information and education.** Clear and accurate communication conveys the nature of management actions and why they are needed.
- **Prevention.** Regulating the introduction of nonnative fish species through stocking, natural reproduction and other sources helps reduce their numbers.
- **Early detection and reporting.** Awareness of new or suddenly increasing nonnative fish populations helps prevent their expansion.
- **Information and data management.** Accurate data leads to objective, science-based decisions on nonna-

tive fish management.

- **Mechanical removal.** Study results show this is the most effective method to reduce the numbers of problematic fish species and effectively increase endangered and other native fish populations.
- **Research and development.** Research provides a better understanding of the life history of nonnative fish species and provides the objective scientific basis for future actions.

Future actions

In spring and summer 2009, biologists plan to conduct the same number of sampling trips to remove nonnative northern pike and smallmouth bass in sections of river in the Upper Basin. Efforts will be further evaluated once a cumulative analysis of existing data is completed in 2010.

“The Recovery Program’s nonnative fish management actions are complex and large in scope,” said Recovery Program Director Bob Muth. “We are fortunate to have expert researchers from state and federal wildlife agencies, universities and private consulting firms involved in these efforts. Working together we can successfully manage nonnative fishes in the Yampa River and elsewhere in the Upper Basin.”

For more information, contact Tom Chart, 303-969-7322, ext. 226, tom_chart@fws.gov. 🐟



COLORADO DIVISION OF WILDLIFE BIOLOGIST ANITA MARTINEZ HOLDS A SMALLMOUTH BASS REMOVED FROM THE YAMPA RIVER.

Nonnative fish management continues in San Juan River

As this issue of *Swimming Upstream* went to press, the San Juan River Basin Recovery Implementation Program was completing its first full year of expanded efforts to reduce the numbers of nonnative channel catfish and common carp in the San Juan River. Last year, biologists noted an encouraging decline in the sizes of these large-bodied fish that compete with and prey upon endangered Colorado pikeminnows and razorback suckers.

Expanded work was a cooperative effort among the U.S. Fish and Wildlife Service, the New Mexico Department of Game and Fish, the University of New Mexico, the Bureau of Indian Affairs and the Navajo Nation. Biologists from these agencies conducted eight removal passes throughout 95 miles of the San Juan River that had previously been sampled only on a limited scale. Results of this year’s work will be reported in the next issue of *Swimming Upstream*.

For more information, contact Jason Davis, (505) 342-9900, ext. 108, or jason_e_davis@fws.gov. 🐟



SINCE THE INITIATION OF NONNATIVE FISH REMOVAL EFFORTS IN THE SAN JUAN RIVER, LARGER CHANNEL CATFISH, SIMILAR TO THE ONE PICTURED, HAVE BECOME LESS COMMON IN RIVERWIDE COLLECTIONS.



Ear bones reveal timing of spawning and opportunities to manage smallmouth bass in Yampa and Green rivers

—by Kevin R. Bestgen, Senior Research Scientist, and Angela A. Hill, Research Associate, Larval Fish Laboratory, Colorado State University

Nonnative smallmouth bass populations were recently established and are now abundant in warmer reaches of the upper Colorado River system. Smallmouth bass are especially problematic because they occur in main-channel and shoreline habitats where they compete with, or prey upon, both small and large native fishes.

The Upper Colorado River Endangered Fish Recovery Program is implementing management actions to reduce the abundance of smallmouth bass in river reaches occupied by the endangered fishes. A primary, ongoing technique is removal of large numbers of juvenile- to adult-size smallmouth bass. Combining this approach with efforts to reduce numbers of smaller-sized smallmouth bass may be an effective strategy to successfully manage this species. Removal of just-hatched fish is problematic because their small body size and high abundance makes most capture methods ineffective.

One technique that could be used to reduce numbers of smallmouth bass is to disadvantage their reproductive success. Studies of smallmouth bass outside the Upper Colorado River Basin (Upper Basin) show that weather-related water temperature reductions or floods reduce their spawning success and number of offspring. Reduced water temperatures often

result in abandonment of spawning nests by the guarding male smallmouth bass, after which developing eggs and just-hatched young are susceptible to predation. Sampling in the Green River and other areas has shown that higher stream flow, often coupled with increased water turbidity, sweeps weak-swimming young fish away from nests or quiet near-shore habitat, and results in high mortality.

A key to understanding when small-sized smallmouth bass would be most susceptible to a fluctuation in flow or temperature is to predict timing of spawning. Analysis of ring deposition patterns in fish otoliths — tiny bony structures in fishes that compose the inner-ear system — may be the key to obtaining such information. Scientists discovered more than 30 years ago that many fish species deposit daily rings that are recognizable as alternating light and dark bands in otoliths. This is similar to tree rings that allow scientists to understand the age of a tree in years.

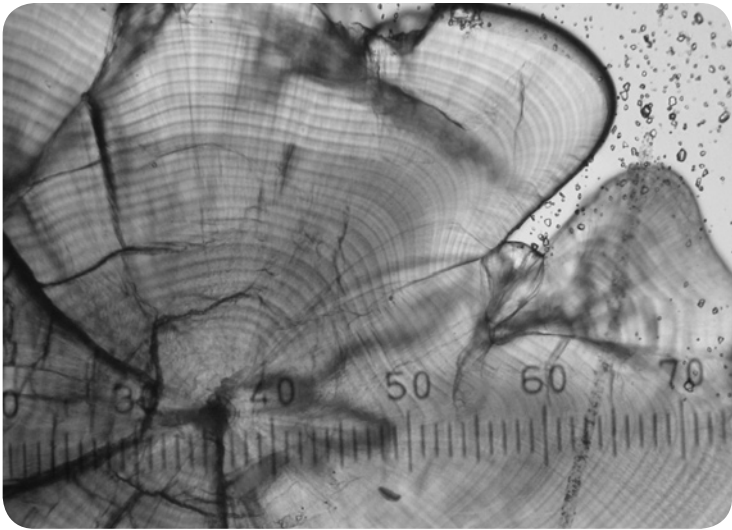
How the aging technique is used

Biologists gather samples of young smallmouth bass from streams in the summer and preserve them. The fish are returned to the laboratory where the otolith is removed from the head of the fish, placed on a microscope slide, and examined under a high-powered microscope. The size of the otolith is measured and the number of otolith rings is counted, which represents the age of the fish in days.

Findings from other studies indicate that the first otolith ring is deposited about the time of hatching. Thus, by knowing when the fish was captured, it is easy to subtract the age of the fish that was estimated by counting otolith rings to obtain the hatching date of that fish. By aging a large sample of fish, biologists can estimate when most fish in the population were hatched.

The development time of smallmouth bass eggs after fertilization is about 5-10 days, depending on water temperatures. This information helps researchers determine when peak spawning times for that population occur. Analyses of this kind over a period of time provide an understanding of the flow levels and water temperatures during which smallmouth bass spawning occurs. Once these relationships are established, predictions about spawning times can be made. Preliminary information suggests that smallmouth bass spawning occurs when river flows are declining and water temperatures are warming and in the range of 59-64° F, which usually occurs in June.

A logical next question is how this information would be used to disadvantage spawning success of smallmouth bass. Knowing when smallmouth bass nests are active would allow biologists to physically disturb nests or remove guarding males, which would reduce the success of that nest. Nest disruption may also be possible on a larger, river-reach scale by inducing low water tempera-



POLISHED THIN SECTION OF A PORTION OF AN OTOLITH OF A SMALLMOUTH BASS AT 100X MAGNIFICATION. OTOLITHS ARE LOCATED DIRECTLY ADJACENT TO THE BRAIN OF BONY FISHES. THE SMALLMOUTH BASS WAS 45 MM TOTAL LENGTH (1.8 INCHES) AND WAS 38 DAYS OLD, BASED ON COUNTS OF THE CONCENTRIC DAILY RINGS.

tures or higher flows for short times during spawning. Such environmental disturbances could be produced through release of colder or higher flows in streams such as the Green River, which is regulated by Flaming Gorge Dam.

Similar stream flow experiments have been conducted in the recent past in the Grand Canyon reach of the Colorado River, where large volumes of water were released from Glen Canyon Dam to benefit downstream natural resources, including native fishes. Among many other factors, researchers also need to know how other native and nonnative fish species would respond to short-term increases in flows or reduced water

temperatures. When combined with other techniques to reduce larger smallmouth bass, stream flow or water temperature manipulations to disadvantage young smallmouth bass may be necessary to reduce their abundance and assist with recovery of endangered and other native fishes in the Upper Basin. ◀

Editor's note: Preliminary results of the smallmouth bass otolith study are expected in spring 2009. The Recovery Program will use the data to determine management actions needed to help recover the endangered fishes. For more information, contact Tom Chart, 303-969-7322, ext. 226, tom_chart@fws.gov.

Bringing the razorback sucker back from the brink

continued from page 1

- Razorback sucker larvae are surviving through the first year in the Green, Gunnison and San Juan rivers based on captures of juveniles. Numbers of larvae collected from the Green River in 2007 were the highest ever recorded.
- Along the Colorado River, downstream of the Grand Canyon, Lake Mead is one of the most unique habitats in the entire Colorado River Basin because it has a self-sustaining population of razorback suckers. Over the last 12 years, Lake Mead has supported a population of 250-500 adults, with sustained recruitment for at least 30 years.
- South of Lake Mead is Lake Mohave which contains the most genetically diverse adult populations of razorback suckers. There had been a large population in the reservoir shortly after impoundment, but these fish were not recruiting and were projected to die-off due to old age around the turn of the century. Today the old wild population is estimated to be less than 50 fish, but now on the spawning grounds there are roughly 1,500 repatriated adults (wild larvae collected from the lake, grown in a hatchery for two years and returned to the lake). These provide thousands of larvae each year to raise and stock throughout the Lower Basin.
- Approximately 1,500 adult razorback suckers congregate near Needles, Calif., to spawn. In 2008, razorback suckers stocked at Laughlin, Nev. (30 miles upstream of Needles), and Bill Williams River, Ariz. (50 miles downstream of Needles), were found at the Needles spawning bar within 10 days of release.

Addressing nonnative fish management challenges. Predation and competition by nonnative fish species are serious threats to the endangered fishes. Over the past

100 years, more than 70 nonnative fish species have been introduced in the Colorado River Basin. Research has found that razorback sucker eggs are preyed upon by nonnative fish species, and juvenile razorback suckers less than 10 to 12 inches long are vulnerable to being eaten by large, primarily nonnative fishes. The recovery programs are removing the most problematic nonnative fishes from the rivers and preventing nonnative fish from entering the river system in areas inhabited by endangered fish. These actions recognize the dual responsibilities of state and federal wildlife agencies to conserve native fish species while providing sportfishing opportunities.

Research and monitoring. The recovery programs monitor reproduction, growth, survival and abundance of endangered fish in the wild. Studies of the roles of bird and nonnative fish predators are ongoing. Results are used to track progress, assess the effectiveness of management actions and adjust recovery efforts through adaptive management.

Reaching out to local communities. Innovative educational programs help enhance awareness and increase public support for endangered fish recovery via interpretive exhibits at visitor centers, annual water festivals, information tables at conferences, aquariums with endangered fish species established in local classrooms and student tours. ▶

Study estimates survival of stocked razorback suckers

—By Koreen Zelasko, Research Associate, Larval Fish Laboratory, Colorado State University

Hatchery-produced, stocked fish form the foundation to reestablish naturally self-sustaining populations of razorback sucker in rivers of the Upper Colorado River Basin (Upper Basin). In 2003, the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) finalized a stocking plan to expedite reestablishment of razorback sucker populations and achieve the demographic criteria of the species' recovery goals.

The stocking plan directs hatchery managers to raise fish until they are at least 12 inches in length, which typically takes two years, before releasing them in rivers. The plan assumes that 50 percent of those 2-year-old fish will survive their first year and that 60 percent of those fish will survive as 3-year-olds. Thereafter, annual survival of adult fish is assumed to plateau at 70 percent based on data for wild razorback suckers.

If enough razorback suckers are stocked, those survival rates should allow substantial populations to develop, providing those fish reproduce and their young survive. However, when the stocking plan was finalized, survival rates of hatchery-produced razorback suckers of any size or age stocked in Upper Basin rivers were unknown.

In 2007, the Recovery Program embarked on a research study conducted by scientists at Colorado State University's Larval Fish Laboratory to analyze razorback sucker stocking and recapture data for the purpose of estimating survival rates. Razorback suckers are tagged using microchip technology prior to stocking. Stocking and tag recapture data from various studies from 1995 through 2006 were analyzed. Because survival rates of razorback suckers may be affected by the size and age of fish at release — as well as year, season and location of release — those factors were also included in the analysis.

Time since stocking and fish length had the greatest effects on survival of stocked razorback suckers. Only about 14 percent of hatchery fish that are age 2 and about 12 inches are estimated to survive their first year in the



STOCKED, HATCHERY-PRODUCED RAZORBACK SUCKERS ARE REPRODUCING IN THE COLORADO, GREEN, GUNNISON AND SAN JUAN RIVERS.

river after stocking. That rate is substantially lower than the 50 percent survival rate the stocking plan assumes. In contrast, 49 percent of stocked fish that are age 4 and 15 inches in length are estimated to survive their first year in the river, which is also lower. Importantly, if a razorback sucker survives its first year after stocking, it has a much higher (75 percent) survival rate in the following years, regardless of its length at stocking.

The season during which a fish was stocked also influenced first-year survival. Razorback suckers stocked during summer had significantly lower survival estimates than those stocked during any other season.

The Recovery Program is using these findings to determine if changes are needed in the stocking plan and to assess the capacity of hatchery facilities to accommodate those changes. Additional analysis of stocking and recapture data is planned. For more information, contact Tom Czaplá, 303-969-7322, ext. 228, tom_czapla@fws.gov. ▶

A great day for endangered fish! Community celebrates completion of capital projects in western Colorado

The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) held a dedication ceremony on July 1, 2008, to celebrate completion of a 900-foot-long fish passage at the Price-Stubb Diversion Dam in western Colorado. The dam was the last remaining barrier to fish migration on the Colorado River from Utah's Lake Powell to the upper end of critical habitat near Rifle, Colo.

Other capital projects in western Colorado for endangered fish were also recognized. These include fish passages and screens at three privately owned and operated diversion dams; a hatchery raising endangered razorback suckers to stock in rivers; canal check structures that help conserve water; a barrier net at a local reservoir that prevents nonnative sport fish from escaping into the Colorado River; and more than 1,100 acres of restored floodplain habitat.

"Today, we celebrate the completion of capital projects in Colorado's Grand Valley to benefit endangered fish," Deputy Secretary of the Interior Lynn Scarlett told a crowd of more than 100 people. "These projects are a result of the collaboration, cooperation and hard work of Recovery Program partners and the community to ensure that endangered species conservation and water development and management can co-exist."

The Bureau of Reclamation (Reclamation) supervised all aspects of the construction of the capital projects.



COMPLETED IN MAY 2008, THIS 900-FOOT-LONG, ROCK CHANNEL FISH PASSAGE AT THE 8-FOOT-HIGH PRICE-STUBB DIVERSION DAM IN WESTERN COLORADO REMOVED THE LAST REMAINING BARRIER TO FISH MIGRATION ON THE COLORADO RIVER IN 290 MILES OF RIVER FROM UTAH'S LAKE POWELL TO THE UPPER END OF CRITICAL HABITAT NEAR RIFLE, COLORADO. THE PASSAGE CONSISTS OF 190 CONCRETE CYLINDERS THAT FORM THE FISH PASSAGE AND CREATE BETTER FLOW CONDITIONS FOR THE FISH.

Reclamation Deputy Commissioner Kris Polly said, "Reclamation has examined each project from different perspectives, tested new ideas and created state-of-the-art solutions for endangered fish recovery. Today, with screens installed to prevent canal entrapment, fish can freely swim upstream with access to restored floodplain habitat. It is a success for endangered fish recovery in the Grand Valley."

City of Grand Junction Utility and Street Systems Director Greg Trainor addressed the city's direct and indirect water interests related to the Colorado and Gunnison river systems as they relate to the needs of this growing western Colorado community. These include working with water users in the Grand Valley and upstream to provide water for irrigation, municipal use and recreation.

"The Recovery Program has provided all of us an opportunity to work together for the benefit of the endangered fish and for our own benefit," he said. "The intended consequence of the program has been the development of 1,500 water projects with depletions of 2.2 million acre-feet from the stream systems. The unintended consequence is that the Recovery Program has provided a platform for the water users statewide, federal and state agencies, municipalities and others, to come together on many other water issues essential to their collective survival."

While people benefit from these cooperative efforts, so do endangered and other native fish.

"Completion of capital projects in the Grand Valley brings these rare, big-river fish a giant step closer to recovery," said Jay Slack, deputy regional director, U.S. Fish and Wildlife Service,

Mountain-Prairie Region. "Colorado pikeminnows and razorback suckers are known to migrate long distances to complete their life cycle. With the opening of the Price-Stubb fish passage, fish now have the ability to move freely in 290 miles of the Upper Colorado River.

"Restoring passage at these barriers gives fish access to river reaches above diversion structures where more water and habitat are available. Not only will this benefit the endangered fishes, but also other native fish species including bluehead sucker, flannelmouth sucker and roundtail chub."

Other dedication speakers were U.S. Representative John Salazar and Jennifer Gimbel, director of the Colorado Water Conservation Board. Recovery Program Management Committee Chairman John Shields from the Wyoming State Engineer's Office served as master of ceremonies.

Following the dedication ceremony, many participants toured a fish passage and screen at the privately owned Redlands Water and Power Company facility. Redlands Water and Power Superintendent Kevin Jones and U.S. Fish and Wildlife Service Colorado River Fishery Project Leader Chuck McAda explained how these facilities work and how they contribute to recovery of the endangered fish.

Tour participants then visited a restored floodplain wetland at the Grand Valley Audubon Society's Lucy Ferril Ela Wildlife Sanctuary where Grand Valley Audubon Society President Bob Wilson and Dan Alonso, manager of the Ouray National Wildlife Refuge and Colorado River Wildlife Management Area, explained how a floodplain wetland was restored and why floodplains play an important role in the life history of endangered fish.



DEDICATION SPEAKERS (LEFT TO RIGHT): MASTER OF CEREMONIES JOHN SHIELDS, INTERSTATE STREAMS ENGINEER, WYOMING STATE ENGINEER'S OFFICE; JENNIFER GIMBEL, DIRECTOR, COLORADO WATER CONSERVATION BOARD, STATE OF COLORADO; KRIS POLLY, DEPUTY COMMISSIONER, BUREAU OF RECLAMATION; LYNN SCARLETT, DEPUTY SECRETARY, DEPARTMENT OF THE INTERIOR; JOHN SALAZAR, U.S. REPRESENTATIVE; JAY SLACK, DEPUTY DIRECTOR, U.S. FISH AND WILDLIFE SERVICE; MOUNTAIN-PRAIRIE REGION; AND GREG TRAINOR, UTILITY AND STREET SYSTEMS DIRECTOR, CITY OF GRAND JUNCTION.

Recovery Program news and updates

swimming upstream



Five-year review of recovery goals slated for completion in 2009

The U.S. Fish and Wildlife Service approved recovery goals for the four endangered fishes in 2002 that provide objective, measurable criteria for downlisting to "threatened" and delisting (removal from Endangered Species Act protection).

Results of research-based adaptive management and monitoring of endangered fish populations provide information that may warrant changes in the recovery goals. The recovery goals are reviewed, and revised as needed, at least every five years. This first review is underway with completion slated for 2009.

For more information, contact Tom Czaplá, 303-969-7322, ext. 228, tom_czapla@fws.gov.



Reservoir operators coordinate releases for endangered fish

Upper Colorado River Basin reservoir operators voluntarily coordinated water releases last June to enhance spring peak flows. Water from Green Mountain, Ruedi, Windy Gap and Willow Creek reservoirs, combined with bypass flows from Wolford Mountain and Williams Fork reservoirs, enhanced flows to benefit endangered fish.

Releases are part of the Recovery Program's Coordinated Reservoir Operations Program established in 1995. When weather permits, reservoir operators release water to improve fish habitat without affecting reservoir yields. Most reservoirs also contribute water for late-summer, base-flow augmentation.

For more information, contact Kara Lamb, 970-962-4326, klamb@gp.usbr.gov.



Students raise razorback suckers in classrooms

Students in western Colorado have a hands-on opportunity to learn about endangered fishes and the river ecosystem through a unique program cosponsored by the Colorado Division of Wildlife (CDOW) and the Upper Colorado River Recovery Program. Since 2000, elementary and high school science classes have raised razorback suckers in classroom aquariums during the school year and released them in the river each spring.

The fish are provided by the Grand Valley Endangered Fish Facility, and CDOW Education Specialist Kathleen Tadvick oversees this important program and helps teachers transform their students into "young scientists."



Catch a northern pike at Wolford Mountain Reservoir, earn \$20

That's the deal the Colorado River District, owner of Wolford Mountain Reservoir in Colorado, is offering anglers in an effort to help preserve the reservoir's trout and kokanee salmon fishery.

The River District and the state of Colorado have invested in stocking the reservoir with trout and kokanee to create a thriving sport fishery. Northern pike threaten the success of the trout and kokanee.

"As of early September, 25 northern pike have been turned in for cash," said River District Senior Water Resources Engineer Ray Tenney.

For more information, contact Ray Tenney, 970-945-8522, rtenney@crwcd.org, or visit the River District's website: www.ColoradoRiverDistrict.org.

Swimming Upstream is a publication of the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. These programs are national models of cost-effective, public and private partnerships. The programs are working to recover endangered fishes while water development continues in accordance with federal and state laws and interstate compacts, including fulfillment of federal trust responsibilities to American Indian tribes.

Debra B. Felker
Editor

UPPER COLORADO RIVER
ENDANGERED FISH RECOVERY PROGRAM
U.S. Fish and Wildlife Service
P.O. Box 25486, DFC • Lakewood, CO 80225
(303) 969-7322 • (303) 969-7327 • Fax
ColoradoRiverRecovery.fws.gov

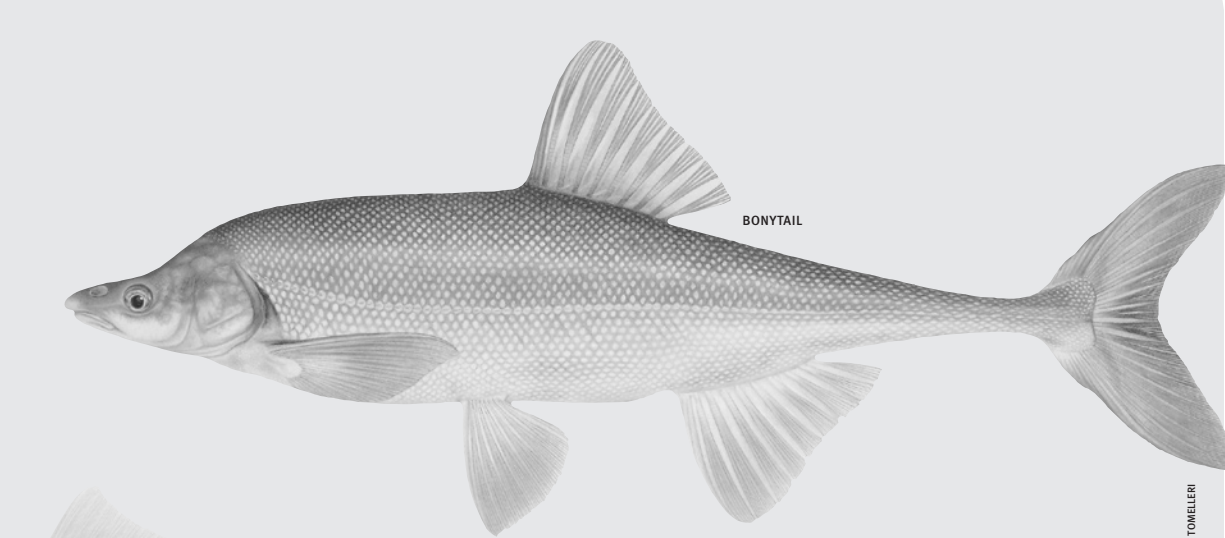
Robert T. Muth
Program Director

Program Partners
Bureau of Reclamation
Colorado River Energy Distributors Association
Colorado Water Congress
National Park Service
The Nature Conservancy
State of Colorado
State of Utah
State of Wyoming
U.S. Fish and Wildlife Service
Utah Water Users Association
Western Area Power Administration
Western Resource Advocates
Wyoming Water Association

SAN JUAN RIVER BASIN
RECOVERY IMPLEMENTATION PROGRAM
2105 Osuna Road, NE • Albuquerque, NM 87113
(505) 761-4745 • (505) 346-2542 • Fax
southwest.fws.gov/sjrip

David L. Campbell
Program Director

Program Partners
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Conservation Interests
Jicarilla Apache Nation
Navajo Nation
State of Colorado
State of New Mexico
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
U.S. Fish and Wildlife Service
Water Development Interests



© COPYRIGHT JOSEPH R. TOMELLER

Program director's message

By Sharon Whitmore, Assistant Program Director
San Juan River Basin Recovery Implementation Program

Editor's Note: San Juan River Basin Recovery Implementation Program Director David Campbell asked his assistant director, Sharon Whitmore, to write this issue's program director's message to introduce herself and to share her perspective of the recovery programs from her experiences working in other river basins.

In July 2007, I moved from Nebraska to New Mexico to become the assistant program director for the San Juan River Basin Recovery Implementation Program. This was a particularly exciting move for me. The majority of my career with the U.S. Fish and Wildlife Service has been working with collaborative efforts on large river systems to conserve natural resources in concert with a myriad of other interests and uses on the river. Working with the San Juan River Recovery Program and its sister program, the Upper Colorado River Endangered Fish Recovery Program, would give me the opportunity to get involved with a new river system and new collaborative programs.

Prior to my move, I was actively involved in developing a recovery program on the Platte River system in Nebraska, Colorado and Wyoming — and, before that, with basin-wide efforts on the seven-state Missouri River. Both of those river systems were in their infancy in establishing structured programs that represented the many interests on the river and set basin-wide goals and objectives.

In place since 1988 and 1992, respectively, the Upper Colorado River and San Juan River recovery programs both have lengthy tenures of cooperative work toward achieving their goals of recovering endangered Colorado River fishes while water development continues. The basic model for the new three-state Platte River Recovery Implementation Program was based on these successful recovery programs. From my vantage on the Platte River and from my experiences with a number of large collaborative programs across the nation, it appeared to me that the two Upper Colorado River Basin Programs truly were premier recovery programs. I was eager to see if my perceptions were correct.

After a year on the job, I can sincerely say that I have not been disappointed. I have been thoroughly impressed by the dedication, professionalism, scientific integrity and cooperative nature of the partners, researchers and staffs of both programs. These programs demonstrate that endangered species conservation and water development and management can be compatible.

A notable illustration of the quality and success of the recovery programs occurred earlier this year when they received the prestigious U.S. Department of the Interior Cooperative Conservation Award that recognizes outstanding conservation achievements attained through collaboration and partnership with others. I was honored to attend the awards ceremony in Washington D.C., in April as a representative of the San Juan River Recovery Program.

Key factors I consider necessary for success of large collaborative programs include a secure funding source, dedicated and committed program participants and staff, scientific integrity of recovery activities and a strong, well-defined organizational structure. The two recovery programs are fortunate to have all of those. Another plus is the close coordination that occurs between the two programs and their partners. Both programs benefit from the healthy exchange of information, sharing of perspectives and pooling of resources to formulate strategies and methods to recover the species and to implement adaptive management.

I firmly believe collaborative programs like the San Juan River and Upper Colorado River recovery programs provide the best approach to conserving natural resources and making progress toward recovering at-risk species. I know how difficult and time consuming it is to bring numerous disparate interests and individuals together to establish and implement these types of programs. Disagreements and conflict are inevitable — but for these two recovery programs, progress toward recovering the endangered Colorado River fishes while responsible water development continues is achievable because of the solid infrastructures that facilitate conflict resolution and provide clear implementation guidelines.

I say “hats off” to all of the participants who persevered to establish and implement these recovery programs. In my opinion, the San Juan River and Upper Colorado River recovery programs are two of the leading collaborative recovery programs in the nation and I look forward to my second year on the job. 🐟

Sharon Whitmore

Department of Interior recognizes programs with cooperative conservation award

The Upper Colorado River and San Juan River recovery programs were among 21 finalists who received the Department of the Interior's Cooperative Conservation Award at a ceremony held April 21, 2008, in Washington, D.C. Secretary of the Interior Dirk Kempthorne presented the awards that recognized groups and individuals who achieved excellence in conservation through collaboration and partnerships.

“These outstanding partnerships and cooperative efforts represent a fundamental way in which our Department provides stewardship for America with integrity and excellence,” Secretary Kempthorne said. “They embody a broad spectrum of conservation work from restoring wetlands, rangelands and mine lands to protecting wildlife, conserving water and fighting invasive species to teaching conservation values to the next generation.”

The Department of the Interior's Cooperative Conservation Award program recognizes conservation achievements resulting from the cooperation and participation of individual landowners; citizen groups; private sector, nongovernmental organizations; and federal, state, local and/or tribal governments. More than 700 groups and individuals were nominated.

“The [recovery] programs deserve this distinction because they are nation-

al models for achieving conservation through collaboration,” said Benjamin N. Tuggle, Ph.D., regional director, U.S. Fish and Wildlife Service Southwest Region. “Both programs have demonstrated that endangered species conservation and water development and management can be compatible. The scope of their accomplishments could only be achieved by groups and individuals voluntarily coming together to solve environmental challenges.”

Actions completed by the recovery programs provide Endangered Species Act compliance for more than 1,600 federal, tribal and non-federal water projects depleting more than 3.1 million acre-feet per year in the Colorado and San Juan rivers and their tributaries in Colorado, Utah, Wyoming and New Mexico.

“The dedication and commitment of program partners are effective in moving toward recovery of the endangered fishes,” said Steve Guertin, Mountain-Prairie regional director and Implementation Committee chairman for the Upper Colorado River program. “Cooperative relationships have resulted in each program's ability to provide river flows, restore habitat, construct and operate fish passages and screens, produce and stock endangered fish, reduce predation and competition by nonnative fish, and monitor the results of these recovery actions.” 🐟



TAMI HEILEMANN, DOI

RECEIVING THE COOPERATIVE CONSERVATION AWARD ARE (LEFT TO RIGHT): DALE HALL, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE; TOM ISEMAN, WATER INITIATIVE PROGRAM MANAGER, THE NATURE CONSERVANCY IN COLORADO; SHARON WHITMORE, ASSISTANT DIRECTOR, SAN JUAN RIVER RECOVERY PROGRAM; LYLE LAVERTY, ASSISTANT SECRETARY FOR FISH AND WILDLIFE AND PARKS; ANGELA KANTOLA, ASSISTANT DIRECTOR, UPPER COLORADO RIVER RECOVERY PROGRAM; STANLEY POLLACK, WATER RIGHTS COUNSEL, NAVAJO NATION DEPARTMENT OF JUSTICE; JOHN SHIELDS, INTERSTATE STREAMS ENGINEER, STATE OF WYOMING AND MANAGEMENT COMMITTEE CHAIRMAN, UPPER COLORADO RIVER RECOVERY PROGRAM; DIRK KEMPTHORNE, SECRETARY, DEPARTMENT OF THE INTERIOR; AND BOB MUTH, DIRECTOR, UPPER COLORADO RIVER RECOVERY PROGRAM.

New regional director oversees endangered fish recovery efforts

Last February, Steve Guertin assumed his duties as regional director of the U.S. Fish and Wildlife Service's (Service) Mountain-Prairie Region headquartered in Denver, Colo. The region includes Montana, Wyoming, Colorado, Utah, North Dakota, South Dakota, Nebraska and Kansas. Steve is also chairman of the Upper Colorado River Endangered Fish Recovery Program's Implementation Committee which governs the Recovery Program and is comprised of one representative of each of the Recovery Program's partners.



DEBBIE FELNER

U.S. FISH AND WILDLIFE SERVICE MOUNTAIN-PRAIRIE REGIONAL DIRECTOR STEVE GUERTIN (LEFT) TALKS WITH UPPER COLORADO RIVER RECOVERY PROGRAM DIRECTOR BOB MUTH

Steve came to Denver after working as the Service's budget officer for the past eight years in Washington, D.C., and for the Department of the Interior for eight years. Prior to that, he served for eight years as an infantry officer in the United States Marine Corps in a variety of leadership assignments in Hawaii, California, Virginia and overseas.

“I am grateful for this opportunity to work with our state partners, other federal agencies, tribal governments, private organizations and the public to conserve and protect the outstanding natural resources found in the Mountain-Prairie Region,” Steve said. “I look forward to working more closely with Recovery Program partners, many of whom I met during their annual trip to Washington, D.C. I remain impressed with the Recovery Program's cooperative approach toward species recovery.” 🐟

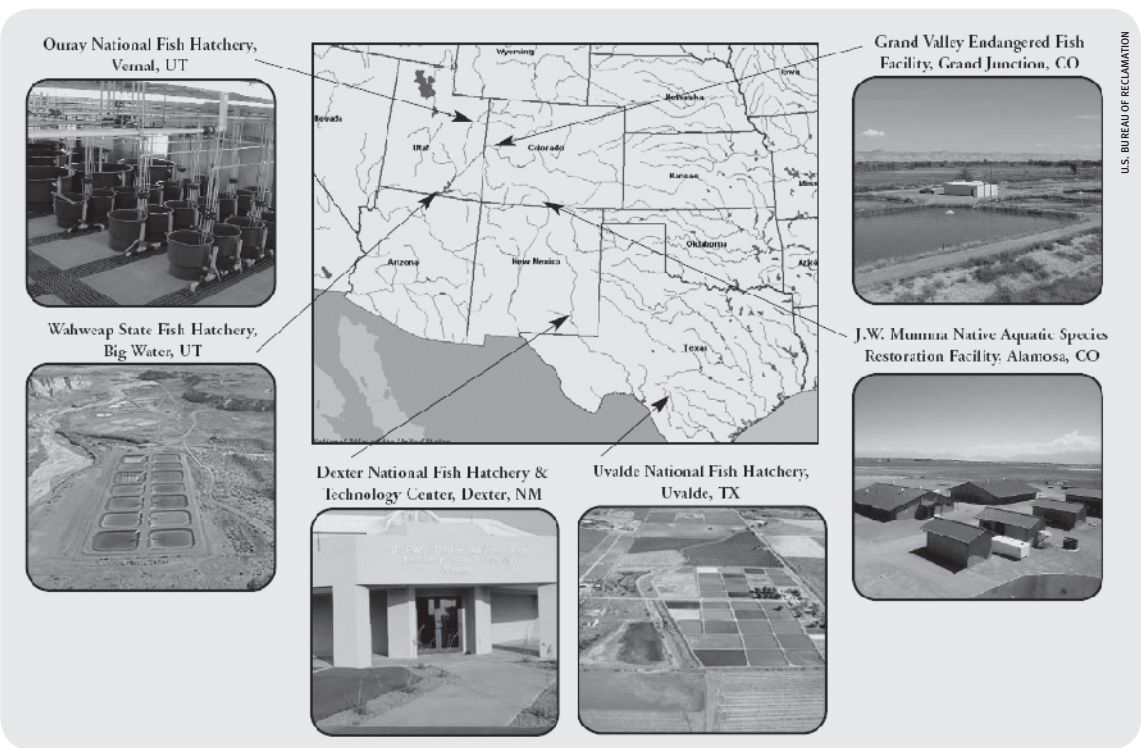
Hatcheries play vital role in recovery of endangered fishes

Six hatcheries produce endangered fish for the Upper Colorado River and San Juan River Basin recovery programs to meet the annual and long-range stocking targets. The hatcheries manage broodstocks and raise endangered fishes to maximize their genetic diversity and increase the likelihood that stocked fish can cope with local habitat conditions in the wild.

Razorback suckers and bonytails were essentially gone from the Upper Colorado River Basin when stocking of hatchery-produced fish began to reestablish populations.

Both recovery programs finalized stocking plans in 2003 to expedite reestablishment of wild populations of endangered fish. Survival, growth and reproduction of stocked fish are monitored to evaluate and improve stocking strategies.

Dexter National Fish Hatchery and Technology Center, Dexter, N.M. Established in 1931, originally to produce warm-water sportfish species. Today Dexter is the only facility in the nation dedicated to holding, studying, culturing and distributing endangered fish to restock in waters where they occurred naturally. Dexter produces Colorado pikeminnows to stock in the San Juan River, provides bonytail larvae to J. W. Mumma Native Aquatic Species Restoration Facility and Wahweap State Fish Hatchery for grow-out and to stock in the Colorado and Green rivers, and provides razorback sucker larvae to Uvalde National Fish Hatchery for grow-out and to stock in the San Juan River.



THIS MAP OF THE SOUTHWESTERN UNITED STATES SHOWS THE LOCATION OF SIX HATCHERIES FUNDED BY THE UPPER COLORADO RIVER AND SAN JUAN RIVER BASIN RECOVERY PROGRAMS TO MAINTAIN ENDANGERED FISH BROODSTOCKS AND PRODUCE FISH FOR STOCKING.

Grand Valley Endangered Fish Facility, Grand Junction, Colo. Originally established by the Upper Colorado River Recovery Program in 1992 with completion of grow-out ponds at Horsethief State Wildlife Area. A hatchery was built in 1996 to expand propagation efforts. This facility was expanded in 1998-1999. In addition to the hatchery expansion, several ponds have been acquired or leased throughout the Grand Valley and are used to grow-out razorback

suckers to stock in the Colorado and Green rivers.

J.W. Mumma Native Aquatic Species Restoration Facility, Alamosa, Colo. Established by the State of Colorado in 2001 to culture aquatic species that were declining in numbers. In 2002, the facility received its first shipment of bonytail larvae from Dexter National Fish Hatchery and Technology Center. The hatchery raises and stocks these fish in the Colorado and Green rivers. This year, the hatchery

conducted a research project to simulate river flows in the hatchery to acclimate the fish to the river environment before they are stocked.

Ouray National Fish Hatchery, Vernal, Utah. Originally established in 1996 as a fish refuge and technology-development facility to assist in recovery of the endangered fishes. Currently, Ouray’s primary focus is production of razorback suckers. Ouray maintains the primary Green River razorback sucker

broodstock and produces razorback suckers to stock in the Green River.

Uvalde National Fish Hatchery, Uvalde, Texas. Established in 1937, originally to produce sportfish. Today, Uvalde’s primary mission is to serve as a refuge for native, threatened and endangered fish species and to provide fish for restoration and recovery efforts. Uvalde raises razorback suckers to stock in the San Juan River.

Wahweap State Fish Hatchery, Big Water, Utah. Established in 1970, originally to produce sportfish to stock in Utah’s Lake Powell. The Wahweap facility is currently a multipurpose facility, raising bonytails and holding razorback suckers for the Upper Colorado River Recovery Program. Wahweap maintains a back-up broodstock of Green River razorback suckers, and raises bonytails to stock in the Colorado and Green rivers.

“These hatcheries are staffed with highly knowledgeable professionals who have overcome many challenges to ensure that hatchery operations are sound and provide genetically diverse fish to meet stocking plans,” said Upper Colorado River Recovery Program Propagation Coordinator Tom Czapl. “Stocking endangered fish to enhance or reestablish self-sustaining populations is a key element in the overall recovery efforts.”

For more information, contact Tom Czapl, 303-969-7322, ext. 228, tom_czapla@fws.gov (Upper Colorado River recovery program); Sharon Whitmore, 505-761-4753, sharon_whitmore@fws.gov (San Juan River Basin recovery program). 🐟

San Juan Program welcomes staff biologist

Biologist Scott Durst joined the San Juan River Basin Recovery Implementation Program staff in September to coordinate the many biological aspects related to recovery of endangered Colorado pikeminnows and razorback suckers in the San Juan River. Scott has been working with endangered species in Southwestern riparian systems since 2001. Most recently he worked for the U.S. Geological Survey–Southwest Biological Science Center in Flagstaff, Ariz., where he studied the ecology of endangered Southwestern Willow Flycatchers in central Arizona and the abundance, distribution and habitat use of candidate species Western

Yellow-billed Cuckoos along the lower Colorado River.

In addition to his experience conducting field research, Scott has contributed to numerous professional publications as both a lead- and co-author. His work on the Southwestern Willow Flycatcher range-wide database breeding site and territory summary has been the cornerstone of the U.S. Fish and Wildlife Service’s efforts to track the progress of recovery and conservation for this endangered bird.

Scott earned a master’s degree in biology from Northern Arizona University. He was a Peace Corps volunteer in Ghana, West Africa, where he taught biology,



SCOTT DURST

chemistry and math. Scott can be reached at 505-761-4739 or scott_durst@fws.gov. 🐟



ELLEN SZCZESNY

Denver’s Downtown Aquarium promotes Endangered Species Day

THE UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM HELPED EDUCATE MORE THAN 700 STUDENTS ON MAY 16, 2008, AT AN ENDANGERED SPECIES DAY EVENT SPONSORED BY THE DOWNTOWN AQUARIUM IN DENVER, COLO. THE AQUARIUM HAS ALL FOUR SPECIES OF ENDANGERED COLORADO RIVER FISHES ON DISPLAY.

swimming upstream

Upper Colorado River Endangered Fish Recovery Program

U.S. Fish and Wildlife Service
P.O. Box 25486, Denver Federal Center
Denver, Colorado 80225